MUIR MHÒR
OFFSHORE WIND FARM

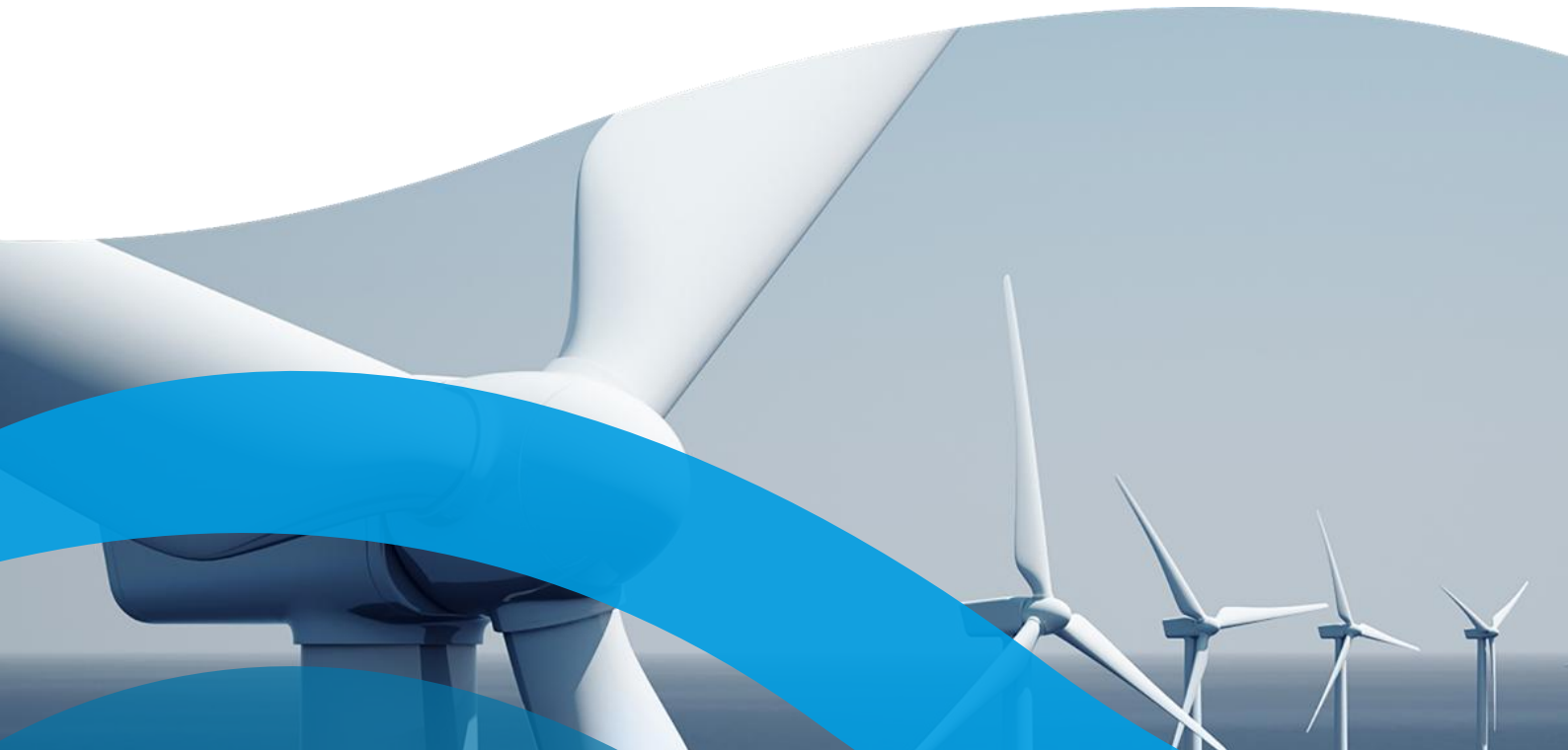
A joint venture between Fred. Olsen Seawind & Vattenfall

Additional Information Report

Muir Mhòr Offshore Wind Farm

Additional Information Report

Chapter 8: Conclusions



Revision No.	Date	Reason for Issue	Author	Reviewer	Approver
01	23/09/2025	Final	GoBe Consultants Ltd.	GoBe Consultants Ltd.	MM OWF Ltd.

Document Information

Document ID	**MMH-GBE-A004-CNT-0005-008**
Revision	1
Date	23/09/2025

Contents

8. Conclusions 7

8.1. Background 7
8.2. Offshore and Intertidal Ornithology 7

Environmental Impact Assement Report 7
Report to Inform Appropriate Assessment 8
Compensation 9

8.3. Fish Ecology 10
8.4. Commercial Fisheries 11
8.5. Revisions Following Consultee Input 12

Socioeconomics 12
Marine Mammals 12
Obstacle Free Zone 12

Glossary

Term	Definition
Applicant	Muir Mhòr Offshore Wind Farm Limited.
Array Area	The area in which the generation infrastructure (including Wind Turbine Generators and associated foundations, Inter-array Cables, and Interconnector cable) and Offshore Electrical Platform(s) will be located.
Floating foundations	The floating structures on which the Wind Turbine Generators are installed.
Foundation anchors	The structures which anchor the Floating Foundations to the seabed, connected to the foundation mooring.
Inter-array Cables	Cables which link the Wind Turbine Generators to each other and to the Offshore Electrical Platform(s).
Interconnector cable	Cable which links the Offshore Electrical Platforms to one another, allowing for power to be transferred between the platforms.
Landfall	The area between Mean High Water Springs and Mean Low Water Springs where the Offshore export cables are brought onshore.
Obstacle Free Zone	The Obstacle Free Zone will contain no operational infrastructure from the seabed surface upwards: floating foundations, foundation moorings, foundation anchors, Wind Turbine Generators and Offshore Electrical Platform(s).
Offshore Electrical Platform (OEP)	Offshore platform consisting of High Voltage Alternating Current equipment, details depending on the final electrical set up of the Project.
Offshore Export Cable Corridor (ECC)	The area within which the Offshore export cable(s) will be installed.
Offshore export cable(s)	The subsea electricity cable circuits running from the Offshore Electrical Platform(s) to the landfall which will transmit the electricity generated by the offshore wind farm to the onshore export cable(s) for transmission onwards to the onshore substation and the national electrical transmission system along with auxiliary cables such as fibre optic cables.
Offshore transmission infrastructure	The proposed transmission infrastructure comprising: Offshore Electrical Platform(s) and associated foundations and substructures; the Offshore export cable(s); and the landfall area up to Mean High Water Springs.
Project	Muir Mhòr Offshore Wind Farm – comprises the wind farm and all associated offshore and onshore components.
Proposed Development	The Muir Mhòr Offshore Wind Farm project elements to which the Offshore Environmental Impact Assessment Report relates.
Wind Turbine Generator (WTG)	The wind turbines that generate electricity consisting of tubular towers and blades attached to a nacelle housing mechanical and electrical generating equipment.

Acronyms and Abbreviations

Term	Definition
AEI	Additional Environmental Information
AEOSI	Adverse Effect on Site Integrity
AIR	Additional Information Report
ANS	Artificial Nesting Structure
CIEEM	Chartered Institute of Ecology and Environmental Management
ECC	Export Cable Corridor
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
GNS	Greater North Sea
HPAI	Highly Pathogenic Avian Influenza
HRA	Habitats Regulations Appraisal
IAC	Inter-array Cable
ICES	International Council for the Exploration of the Sea
INNS	Invasive Non-Native Species
iPCoD	Interim Population Consequences of Disturbance Model
km	Kilometres
km^2	Kilometres squared
LSE	Likely Significant Effects
MD-LOT	Marine Directorate – Licensing Operations Team
MD-SEDD	Marine Directorate – Science, Evidence, Data and Digital
MLWS	Mean Low Water Springs
MPA	Marine Protected Area
NTS	National Trust for Scotland
OEP	Offshore Electrical Platform
OFZ	Obstacle Free Zone
PVA	Population Viability Analysis
RIAA	Report to Inform an Appropriate Assessment
RSPB	Royal Society for Protection of Birds
S(pot)	Spawning Potential
sCRM	Stochastic Collision Risk Model
SPA	Special Protection Area
SSB	Spawning Stock Biomass
SSC	Scottish Seabird Centre
TAC	Total Allowable Catch
UK	United Kingdom
UWN	Underwater Noise
VMNSP	Vessel Management and Navigational Safety Plan

WiSe	Wildlife Safe
WTG	Wind Turbine Generator

8. CONCLUSIONS

8.1. BACKGROUND

8.1.1. The following sections summarise the conclusions reached in each of the Additional Information Report (AIR) topic chapters.

8.1.2. Muir Mhòr Offshore Wind Farm Limited (hereafter referred to as 'the Applicant') is a joint venture between Fred. Olsen Seawind Limited and Vattenfall Wind Power Limited.

8.1.3. The Applicant is proposing to develop the Muir Mhòr Offshore Wind Farm (hereafter 'the Project'). The Project is made up of both offshore and onshore components. The subject of the AIR is the offshore infrastructure only and is relevant to the application for the offshore elements of the Project.

8.1.4. The Muir Mhòr Array Area covers an area of approximately 200 kilometres squared (km^2) and is located approximately 63 kilometres (km) east of Peterhead on the east coast of Scotland. The offshore infrastructure of the Proposed Development includes:

- Up to 67 Wind Turbine Generators (WTGs) and associated floating foundations and foundation anchors;
- Up to two Offshore Electrical Platforms (OEPs) and their associated fixed foundations;
- Inter-array Cables (IAC);
- OEP Interconnector cable;
- Offshore export cables;
- Landfall; and
- Cable protection where required.

8.1.5. The Proposed Development is located wholly in the United Kingdom's (UK) Exclusive Economic Zone (EEZ), and the offshore Export Cable Corridor (ECC) is located within the EEZ and then into the Scottish Territorial Sea to landfall.

8.2. OFFSHORE AND INTERTIDAL ORNITHOLOGY

ENVIRONMENTAL IMPACT ASSEMENT REPORT

8.2.1. The additional information on ornithological receptors is presented in Chapter 2: Offshore Ornithology Environmental Impact Assessment (EIA). NatureScot's queries around seabird colony data prompted a review of the counts for gannet, puffin and kittiwake, revealing:

- Most differences arose from updates in the Seabird Monitoring Programme database, that Highly Pathogenic Avian Influenza (HPAI) related gannet survival comparisons before and during the epidemic showed only minor absolute changes;
- Puffin numbers at North Caithness Cliffs Special Protection Area (SPA) were revised to the figures agreed in consultation; and
- The Fowlsheugh SPA kittiwake count in the EIA was corrected.

8.2.2. With the updated seabORD code unavailable, a displacement matrix approach was adopted. Changing the breeding season assessment to the displacement matrix resulted in increases in the predicted impacts to guillemot and razorbill, with puffin impacts changing slightly and a

decrease in the predicted impacts on kittiwakes. These changes resulted in updated Population Viability Analyses (PVAs) being completed. The overall conclusions of the Environmental Impact Assessment Report (EIAR) were not changed as a result of these updates.

8.2.3. Clarification of kittiwake collision mortality showed that monthly, seasonal and annual totals derive from combined Stochastic Collision Risk Model (sCRM) distributions rather than simple summation and providing an updated methodology did not alter any figures.

8.2.4. Although the EIAR was submitted before NatureScot's new CRM avoidance rates, a kittiwake example confirmed that revised rates would not change the conclusions. NatureScot's challenge to the EIA's magnitude and sensitivity assessments centred on adult survival versus mortality. The choice of sensitivity criteria was addressed by demonstrating the equivalence of survival and mortality changes and by comparing the Chartered Institute of Ecology and Environmental Management (CIEEM) aligned multi-factor approach with Wade *et al.* (2016), which largely maintained or reduced species sensitivities.

8.2.5. The EIAR did not undertake cumulative impact assessment for several species. NatureScot noted that they would need this information to reach conclusions for Arctic tern, great black-backed gull, fulmar, Manx shearwater and red-throated diver. For all species, except great black-backed gull, it was shown that impacts from the Project alone were sufficiently small that no cumulative assessment was needed. However, Project alone impacts, despite occurring only in the non-breeding season, were sufficient to require a cumulative assessment and associated PVA.

8.2.6. These results showed that under the assumption that the PVA was a reasonable reflection of the population and the predicted impacts were estimated using a reasonably accurate methodology, the cumulative impacts would be significant. However, the application suggests that the PVA was not suitable for great black-backed gull due to the absence of specific demographic inputs for some values and that the sCRM model would likely overestimate impacts on a population that was likely only on migration through the Array Area.

8.2.7. A minor exclusion in the information on apportioning of impacts between seabird colonies was noted by NatureScot. The absence of information of the proportion of foraging area that is sea was noted and updated tables have provided this information.

8.2.8. The updated assessments presented in Chapter 2 of the AIR using these data updates and modelling refinements shows the EIAR's conclusion of no significant Project alone or cumulative effects on seabird receptors remains unchanged.

REPORT TO INFORM APPROPRIATE ASSESSMENT

8.2.9. Chapter 3: Ornithology Report to Inform an Appropriate Assessment (RIAA) provides updated PVA outputs, clarifications on impact pathways for puffin, kittiwake, razorbill, guillemot, and gannet, plus refined assessments for both Project alone and in-combination effects across three categories of SPAs:

- Marine SPAs;
- Waterbird SPAs; and
- Breeding seabird SPAs.

8.2.10. For the Project alone scenario, the updated PVAs indicate no Adverse Effect on Site Integrity (AEOSI) for guillemot, razorbill, puffin, and kittiwake across the assessed SPAs. However, in-combination assessments reveal potential AEoSI risks for several SPAs, particularly where populations are already in decline or have been impacted by HPAI. In some cases, the Proposed Development's contribution to cumulative mortality is considered material (razorbill

at Fowlsheugh SPA, puffin at Forth Islands SPA), while in others, it remains below thresholds of concern.

8.2.11. NatureScot and other consultees have provisionally concluded AEoSI for several SPAs, particularly for kittiwake and puffin populations. Chapter 3 of the AIR provides refined modelling to support final determinations and outlines that vessel activity impacts will be managed post-consent through appropriate conditions. These include the development of a Vessel Management and Navigational Safety Plan (VMNSP) to address potential disturbance to marine and waterbird SPAs, particularly where port locations and transit routes are yet to be finalised. NatureScot has indicated that further monitoring of seabird distributions and seasonal sensitivities may be required post-consent to inform spatial or temporal mitigation.

COMPENSATION

8.2.12. In Chapter 4: Offshore Ornithology Compensation, the Applicant proposes to carry forward two of the three compensation measures submitted in November 2024 within the Habitats Regulations Appraisal Assessment (HRA) derogation case and appendices.

8.2.13. Following receipt of the consultee responses to the EIAR, the Applicant has decided not to carry certain measures forward. Both NatureScot and Royal Society for Protection of Birds (RSPB) Scotland have opposed the Artificial Nesting Structure (ANS) compensation measure proposed by the Applicant. The reason provided for this opposition is that nesting habitat is not generally considered a limiting factor for kittiwake in Scotland, and as such it was felt the Applicant should focus on other factors that may be contributing to kittiwake decline. In response, the Applicant has decided not to carry the ANS measure forward and has notified NatureScot and RSPB Scotland of this decision.

8.2.14. Both measures that are to be progressed have been revised and updated to include more detail on their development and implementation. Each involves collaboration with local organisations that possess the necessary expertise to deliver the proposed initiatives. These partnerships are currently being finalised and are contingent on board approval from both the Scottish Seabird Centre (SSC) and the National Trust for Scotland (NTS). All parties have expressed a strong commitment to advancing these collaborations. Should a partnership not come to fruition, the Applicant retains the ability to implement the measures independently by scaling them up at alternative sites beyond the jurisdiction of the proposed partners.

8.2.15. The proposed measures seek to address factors beyond climate change which currently have a negative impact on seabirds, namely human disturbance reduction and predator control.

8.2.16. Human disturbance has been linked to increased stress response and reproductive failure in many seabird species. As such, the target species (kittiwake, guillemot, razorbill, puffin, and gannet) stand to benefit from measures aimed at reducing levels of disturbance, particularly at their breeding sites. Disturbance reduction can also benefit the wider ecosystem as well, allowing non-target species the opportunity to carry out their lifecycle without being disturbed. The Firth of Forth is an ideal location to implement human disturbance measures and further these actions by working with local stakeholders (such as water sports organisations) to raise awareness and promote wildlife safety in this area. Partnering with the Wildlife Safe (WiSe) scheme will increase the reach of this initiative not only at the Firth of Forth, but around the wider eastern Scottish coast.

8.2.17. Predation of seabirds by Invasive Non-Native Species (INNS) on islands is also a concern, and NTS have looked to the Applicant and the developers of Caledonia Offshore Wind Farm to support the development of a new predator control programme on their islands in the north of Scotland. This is a targeted approach aimed specifically at protecting NTS seabird islands from predation by INNS, but it has the potential to be scaled up to other, non-NTS islands elsewhere in Scotland where seabird colonies have been recorded. Similarly to the human

disturbance measure, predator control can also benefit non-target species, such as storm petrel and Manx shearwater, which are also predated upon by INNS.

8.3. FISH ECOLOGY

8.3.1. In Chapter 5: Fish Ecology, additional context on potential impacts of the Proposed Development on North Sea herring (Buchan stock) and sandeel spawning populations and stocks is provided in response to stakeholder concerns and updated advice from the International Council for the Exploration of the Sea (ICES). Chapter 5 of the AIR draws on the EIAR (formally submitted to the Scottish Government's Marine Directorate – Licensing Operations Team (MD-LOT) on 22 November 2024), the latest ICES stock assessments, updated spawning habitat mapping (in line with revised guidance), and supplementary Spawning Potential (S(pot)) calculations.

8.3.2. To quantify the potential effects on spawning stocks of herring and sandeel, the S(pot) of each stock was calculated. These outputs have been evaluated in relation to the latest ICES stock assessments and advice, and the mitigation measures proposed by the Developer. This exercise has identified the potential for Likely Significant Effects (LSE) on herring stocks from Underwater Noise (UWN) and increased suspended sediment concentrations and deposition. This aligns with the conclusions made in Volume 2, Chapter 10: Fish and Shellfish Ecology of the EIAR, and consequently the proposed mitigation measures remain appropriate to ensure that the productivity of the North Sea herring stock is not affected by the Proposed Development.

8.3.3. The North Sea Autumn-Spawning herring stock is under pressure from low recruitment and Spawning Stock Biomass (SSB), and high fishing mortality. S(pot) calculations indicate that UWN and increased suspended sediment concentration and deposition arising during the construction period of the Proposed Development have the potential to lead to implications on the overall productivity of the stock. The mitigation measures set out in the EIAR (such as the use of noise abatement systems, or seasonal restrictions for cable installation works and piling activities) reflect the Applicant's commitment to reduce any impacts to herring to non-significant, and as such, any residual effects from the Proposed Development (both alone, and cumulatively with other developments) are considered to be not significant.

8.3.4. For sandeel, ICES advises zero catch for Sandeel Area 4 in 2025 due to low stock productivity, but potential impacts arising from the Proposed Development alone, and cumulatively with other developments remain low and are not anticipated to lead to implications to the overall productivity of the stock. Further to this, considering the implementation of several proposed measures (including the designation of and Obstacle Free Zone (OFZ) in the Array Area, and the commitment to avoid transiting the Turbot Bank Nature Conservation Marine Protected Area (MPA) with the offshore ECC) any potential impacts to sandeel will be reduced further.

8.3.5. The supplementary contextualisation of the herring and sandeel stocks, and the potential impacts to them from the Proposed Development, as presented in Chapter 5 of the AIR, supports the conclusions made within the EIAR. With mitigation there will be no significant residual effects on fish ecology receptors, either from the Proposed Development alone or cumulatively. This additional contextualisation reinforces the robustness of the EIAR and demonstrates alignment with ICES advice to minimise non-fisheries pressures on early life stages.

8.3.6. Further, to this, additional clarification, regarding the classification of receptor sensitivities (namely herring and sandeel) defined in Volume 2, Chapter 10: Fish and Shellfish Ecology of the EIAR, has been provided, with an aim to provide reassurance to NatureScot on the robustness of the EIAR. Notwithstanding, it is noted, that NatureScot remain in agreement with the overall significance of effect conclusions (from the Proposed Development alone, and cumulatively) made in Volume 2, Chapter 10: Fish and Shellfish Ecology of the EIAR.

8.3.7. Following the contextualisation of herring and sandeel stocks in Chapter 5 of the AIR, the EIAR conclusion of no significant Project alone or cumulative effects on fish ecology receptors remains unchanged. All significant effects identified have been addressed through robust and precautionary mitigation measures as set out within the EIAR. With these measures in place, the Proposed Development will not result in any significant residual effects on fish ecology.

8.3.8. The commitment to various mitigation measures, the designation of an OFZ, and continued engagement with statutory bodies and key stakeholders, demonstrates the Applicant's proactive approach to environmental protection and regulatory compliance.

8.4. COMMERCIAL FISHERIES

8.4.1. Chapter 6: Commercial Fisheries is provided to address a request for additional information from MD-LOT and clarifications raised by Marine Directorate - Science Evidence Data and Digital (MD-SEDD).

8.4.2. Chapter 6 of the AIR confirmed that the commercial fisheries assessment includes *Nephrops* directed activity in the UK demersal otter trawl fleet. Inconsistencies identified by MD-SEDD have been clarified resulting in no overall changes made to the assessment findings; the clarifications provided relate solely to typographical or summary errors, with the justification and analysis sections already presenting the correct and accurate findings.

8.4.3. Residual impacts on potting and hook gear remain of moderate adverse significance during export cable installation and of minor adverse significance in operation, with displacement effects assessed across both the Array Area and offshore ECC.

8.4.4. To address these construction phase impacts, a proportionate mitigation package, comprising Disruption Agreements and a Fisheries Fund, will support affected fleets through construction and the first five years of operation by enabling operational adaptation, gear innovation, training and research.

8.4.5. Stock context further informs the assessment. Haddock in Subarea 4 and Division 6.a is healthy although recruitment is weakening, whereas North Sea herring suffers persistently low recruitment, and revised reference points demand precautionary management. Haddock Total Allowable Catch (TAC), landings, and total catch have trended upward since 2022 and peaked in 2024, yet landings still fall below quotas, and local prices have surged above £2.00/kg despite lower volumes, highlighting strong demand.

8.4.6. To mitigate impacts, an OFZ of 13 km^2 has been integrated into the Array Area layout, targeting areas of relatively higher demersal and pelagic trawl activity. While this does not fully offset displacement, it provides an opportunity to maintain continuing access and operational continuity within those parts of the development footprint identified as areas of relatively higher fishing activity and importance, as corroborated by the data presented in the AIR. A phased monitoring programme, conducted pre-, during, and post-construction, will validate EIA assumptions and inform updates to the Fisheries Management and Mitigation Strategy, with opportunity for additional mitigation to be implemented if monitoring indicates it is necessary.

8.4.7. Overall, the mitigation strategy is designed to be adaptive, evidence-led, and proportionate to the nature and scale of the predicted effects. It reflects the use of best available data, fleet engagement, and alignment with national marine policy objectives for sustainable development and coexistence with commercial fisheries.

8.4.8. None of the matters raised alter the conclusions of the EIA or affect the overall viability of the Proposed Development. The responses provided confirm that the assessment remains robust, proportionate, and fit for purpose, with appropriate mitigation and monitoring measures in place to manage potential impacts on commercial fisheries.

8.5. REVISIONS FOLLOWING CONSULTEE INPUT

8.5.1. Chapter 7: Revisions Following Consultee Input is spilt into three parts to allow clarification on multiple items that did not require a full chapter within the AIR:

- Socioeconomics;
- Marine Mammals; and
- OFZ.

SOCIOECONOMICS

8.5.2. The socioeconomics section of Chapter 7 of the AIR provides an updated assessment of the significant commercial fisheries effects highlighted in the November 2024 EIAR submission. The worst-case scenarios for potential losses to the commercial fisheries sector and the wider economy have been revisited, and the potential for significant socioeconomic outcomes has been re-assessed.

8.5.3. Volume 2: Chapter 17: Socio-economics, Tourism and Recreation of the EIAR concluded no significant effects with respect to socioeconomics, tourism and recreation. The assessment in Chapter 7 of the AIR shows that following full incorporation of the commercial fisheries effects assessed in the EIAR, this conclusion remains the same. No significant socioeconomic effects associated with commercial fisheries are predicted.

MARINE MAMMALS

8.5.4. In response to NatureScot's comments on the EIAR, the updated use of the SCANS III block densities results in greater numbers of bottlenose dolphins predicted to be impacted per piling day in the revised assessment, compared to the assessment presented in Volume 2, Chapter 12: Marine Mammals of the EIAR. The use of Interim Population Consequences of Disturbance Model (iPCoD) modelling has supported the conclusion that the magnitude of impact has increased from Low to Medium in the revised assessment. This increases the significance of effect from Negligible to Minor in the revised assessment, though neither is significant in EIA terms.

8.5.5. The revised cumulative assessment was undertaken using the SCANS III block densities for other projects rather than the uniform Greater North Sea (GNS) density. The iPCoD modelling has shown that the impacted population is predicted to decline to ~94.7% of the unimpacted population size. The use of iPCoD modelling has supported the conclusion that the magnitude of impact should increase from Medium to High in the revised assessment. The significance of effect for the cumulative assessment remains at Minor, the same as it was in Volume 2, Chapter 12: Marine Mammals of the EIAR, which is not significant in EIA terms.

8.5.6. Therefore, despite the change in the density estimate for bottlenose dolphins in the GNS MU, the assessment remains non-significant both for the Project alone and cumulatively with other projects.

OBSTACLE FREE ZONE

8.5.7. The Applicant clarifies that vessels will be instructed (within the VMNSP) to avoid waiting or sheltering within the OFZ and this would then minimise disruption to any fishing vessel intending to use the OFZ area. It's important to note though that navigational safety and compliance with the Convention on the International Regulations for Preventing Collisions at Sea would always override this instruction should a vessel need to access the OFZ to take collision avoidance action.

8.5.8. In line with international law, third party vessel's right to navigate freely cannot be restricted therefore the Applicant has no control on how non-project vessels would use this open sea area.

8.5.9. An outline VMNSP has been submitted as part of the EIAR submission which captures navigational safety and associated mitigations, and the final version submitted for approval post-consent will identify areas that are not suitable for project vessel anchoring/waiting and the OFZ will be included.

MUIR MHÒR
OFFSHORE WIND FARM

A joint venture between Fred. Olsen Seawind & Vattenfall

Muir Mhòr Offshore Wind Farm Ltd
120 Bath Street,
Glasgow,
G2 2EN
muirmhor.co.uk